

quite conspicuous on April 16, and remained so, being brighter and sharper at its less refrangible end and diffuse in the opposite direction.

(4)  $H\alpha$  was very bright on March 12, 16, 21; was equal in intensity to  $H\beta$  on the 25th; greater than it on the 27th, when it was the brightest of all the lines; equal to it on the 28th; greater than it on April 1; less on the 16th; faint on the 19th and 21st; greater yet again on the 23rd; then less on the 24th, 25th, and 26th, on which last date it was very faint.

(5) The line at about  $\lambda 500$  on March 21 was not as bright as  $H\beta$ ; on the 28th became equal to it, faded when the star rose in magnitude on April 1, became greater than it on the 16th, again equalled it on the 19th, became greater on the 21st, less on the 23rd, and the brightest of all the lines on the 24th, 25th, and 26th.

(6) The bright lines shown in this small instrument seem to be coincident with prominent chromospheric lines in the same region of the spectrum.

*Stonyhurst College Observatory:*  
1901 May 1.

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*Further Observations of the New Star in Perseus, made at the  
Radcliffe Observatory, Oxford.*

(Communicated by Arthur A. Rambaut, M.A., Sc.D., F.R.S.,  
Radcliffe Observer.)

This paper is a continuation of two others published in the last two numbers of the *Monthly Notices* (pp. 348 to 354 and 390 to 395). It contains the results of the observations of the magnitude and colour of *Nova Persei* made at the Radcliffe Observatory since the last meeting of the Society.

The estimates included in this paper have been chiefly made with telescopic aid, as encroaching twilight and the diminishing altitude of the *Nova* rendered naked-eye estimations increasingly difficult.

In this set of observations the number of comparison stars has been so limited that, to avoid the necessity of frequent reference to the previous papers, their names and index numbers have been set down in Table I. In cases where a telescope has been used an asterisk is affixed to the reference number.

Table II. contains the means of each observer's separate comparisons, and the general mean for each evening.

The accompanying diagram represents graphically the fluctuating changes in the brightness as evidenced by the Radcliffe observations, and is in continuation of a similar diagram printed on page 391 of the *Monthly Notices*. Upon examination of these

two diagrams it will be noticed that the interval between maximum and minimum brightness seems to have undergone a gradual lengthening, but that the range of variation (as far as the breaks in continuity permit us to form an estimate) appears to have changed but little. The greatest range of magnitude during the period under review occurred within an interval of two days only, viz. between April 21 and 23, 6.00 and 4.36 respectively.

The variations in the colour of the star have been noticed by all the observers, and the suggestion made in the last paper that the change in tint was closely related to fluctuations in brightness has been fully confirmed. In each case where the star has been observed near its minimum the colour has been described as increased in redness, and at maximum an orange tint has been usually noticed.

The difficulty of determining the magnitude of the *Nova* by means of comparisons with the neighbouring stars, all of which exhibit a very different quality of colour—which was remarked upon in the previous papers—has been emphasised during the present period by increasing twilight and the fact that but little opportunity is now afforded for observation owing to the rapidly decreasing altitude of the star after sunset.

TABLE I.

*List of Stars used for Comparison with Nova Persei.*

Ref. No.	Name of Star.	Harvard Photom. Mag.	Ref. No.	Name of Star.	Harvard Photom. Mag.
40	$\kappa$ Persei	3.95	53	36 Persei	5.40
42	$\nu$ Persei	4.00	54	Arg. Z. + 44°734	6.04
47	$\psi$ Persei	4.24	55	Arg. Z. + 44°648	6.47*
48	$\sigma$ Persei	4.39	56	Arg. Z. + 43°818	5.97
50	$l$ Persei	4.84	57	Arg. Z. + 42°754	8.0†
52	30 Persei	5.37	58	Arg. Z. + 43°730	7.0†

TABLE II.

*Means of Estimations of Magnitude of Nova Persei.*

1901.	G.M.T. h m	Observer.	Reference Stars.	Mean Mags.	Adopted Magnitude for the Evening.
April 12	9 30	R.	42, 40, 50	4.70	4.67
	9 45	C.	50, 40, 42	4.63	
13	8 45	R.	42*, 40*, 50*	4.40	4.49
	8 50	W.	50*, 52*	4.75	
	10 0	C.	42, 40, 50	4.40	

\* Revision of D.M.

† D.M. mag. (Argelander.)

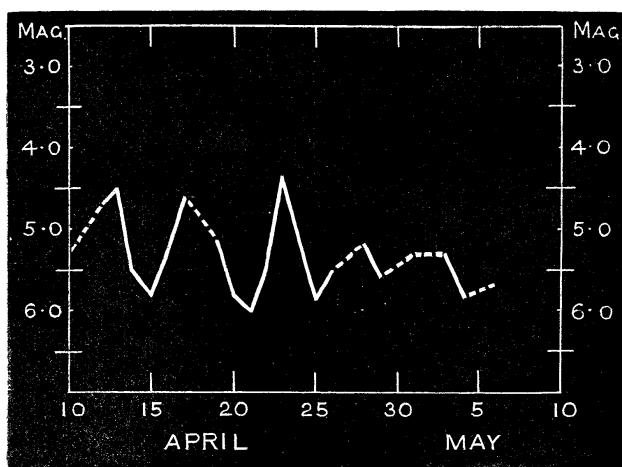
May 1901.

*New Star in Perseus.*

469

1901.	G.M.T.	Observer.	Reference Stars.	Mean Mags.	Adopted Magnitude for the Evening.
April 14	h m 8 55	R.	53, 52, 54	5.50	5.50
	9 40	W.	52*	5.50	
15	9 0	R.	52, 54	5.65	5.82
	9 30	C.	52*, 50*	5.70	
	10 30	W.	52*, 57*	6.40	
16	9 0	R.	52*	5.40	5.32
	10 5	W.	50*, 52*	5.15	
	10 15	R.	52, 50	5.40	
17	7 30	R.	40*, 50*	4.55	4.62
	8 0	R.	50*	4.60	
	9 0	R.	40*, 50*	4.50	
	9 38	W.	50*	4.80	
19	8 23	W.	52*, 50*	5.20	5.13
	8 35	R.	50*, 52*	4.95	
	10 0	C.	52*, 50*	5.25	
20	7 45	R.	56*, 52*	6.00	5.83
	9 0	A.A.R.	52*, 55*	5.95	
	9 0	W.	52*, 55*	5.73	
	9 23	R.	54, 52, 53	5.73	
	9 30	C.	52*, 50*	5.65	
	10 50	C.	55*	6.00	
21	9 0	W.	52*, 55*	6.15	6.00
	9 25	R.	54, 53, 52	5.87	
22	8 23	W.	52*	5.60	5.47
	8 40	R.	52*, 56*	5.55	
	9 0	R.	52*, 56*, 54*	5.50	
	9 8	W.	52*	5.20	
23	9 17	R.	40, 42, 50	4.27	4.36
	9 20	W.	48*, 47*, 40*, 42*, 50*, 40*, 50*	4.47	
	9 20	W.	42, 40	4.50	
	9 38	C.	50*, 40*, 42*	4.27	
24	8 58	W.	52*	5.40	5.08
	9 8	C.	50*, 52*, 40*	4.90	
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1901.	G.M.T. h m	Observer.	Reference Stars.	Mean Mags.	Adopted Magnitude for the Evening.
April 25	8 40	W.	54*, 53*, 52*, 55*	5.58	5.86
	9 15	C.	52*, 56*, 55*	6.13	
26	9 52	W.	53*, 52*	5.40	5.55
	10 45	C.	52*, 56*	5.70	
28	8 40	W.	52*, 50*	5.20	5.20
29	9 43	R.	52*, 56*, 50*	5.56	5.56
May 1	7 50	W.	50*, 40*	4.60	5.32
	8 0	R.	52*	5.50	
	8 5	W.	52*	5.50	
	8 37	C.	52*, 50*, 56*	5.37	5.34
	8 43	W.	52*, 50*	5.30	
4	8 53	W.	52*	5.60	5.83
	8 55	C.	52*, 58*, 54*, 56*	6.00	
	9 20	W.	52*, 55*	5.65	
	9 30	W.	52*, 55*	5.75	
6	9 5	R.	52*, 56*	5.70	5.70
	9 8	C.	52*, 56*	5.70	



Magnitudes of Nova Persei.

*Observers' Notes on the Estimations of Magnitude.*

1901.  
 Apr. 13. Sky misty, but much fainter stars well seen (W.).  
 Apr. 14. The Nova seemed fainter than 52 when seen earlier in the twilight (R.).  
 Apr. 15. With the  $1\frac{3}{4}$ -inch the Nova requires a different focus to surrounding stars. Sky very clear (W.).  
 Apr. 16. Occasionally Nova appeared equal to 52, but brightened up at times and excelled it; the image of Nova was, however, in the  $1\frac{3}{4}$ -inch telescope, larger in area than 52 (W.).  
 Apr. 17. Observed in strong twilight at 7.30 (R.). Sky misty over Perseus (W.).  
 Apr. 19. Sky is misty, but in the  $1\frac{3}{4}$ -inch the small stars between Nova and 50 are easily visible (W.). Difficult to estimate magnitude of Nova to-night, owing probably to slight atmospheric changes; or is it possibly due to rapid physical variations in the object? (R.).  
 Apr. 20. Differences in colour make the estimation of magnitude very difficult.  $\frac{1}{2}$  wt. to 55 (W.).  
 Apr. 22. Some mist about at 8.23 (W.).  
 Apr. 23. Moonlight strong, but sky very clear (W.).  
 Apr. 24. Nova is at times visible to naked eye, but scintillating and vanishing; misty (W.). Thin cloud about; moonlight and twilight troublesome (C.).  
 Apr. 25. Some twilight and strong moonlight (W.). Estimations difficult; strong moonlight and twilight (C.).  
 Apr. 26. Nova very low.  
 Apr. 28. Twilight very strong.  
 Apr. 29. Nova very low in mist. Estimations difficult.  $\frac{1}{2}$  wt. to 50.  
 May 1. Observed in very strong twilight at 7.50. By setting successively and as rapidly as possible on the three objects, with Mr. Robinson's assistance, I considered, by a single estimate, that, taking 10 steps between 40 and 50, Nova was 7 steps fainter than 40 and 3 steps brighter than 50. As the twilight waned the Nova exhibited a duller light in comparison with the other stars (W.). Twilight rather strong (R.).  
 May 3. Strong twilight (C.). In the 10-inch Nova required a different focus to the comparison stars (W.).  
 May 4. Strong twilight (C.). At 9.20 I can just see the stars of  $7\frac{1}{2}$  magnitude which lie between Nova and 50 (W.).

*Observers' Remarks on Colour of Nova and Comparison Stars.*

1901.  
 Apr. 12. 10<sup>h</sup> 15<sup>m</sup>. Nova, in Barclay 10-inch, power 90, red, but not very red (R.).  
 Apr. 13. 8<sup>h</sup> 30<sup>m</sup> to 10<sup>h</sup> 15<sup>m</sup>. Nova, in 10-inch, power 90, red, but not strikingly so (C.). At 8.45 Nova, in Barclay "finder," red, but not very red. No. 40, yellow (R.). With the  $1\frac{3}{4}$ -inch, power 20, I noticed at 8.50 a reddish tinge in Nova, but the star was more yellow than on April 10 (W.).  
 Apr. 14. Nova reddish-yellow in  $1\frac{3}{4}$ -inch (W.).  
 Apr. 15. Nova is very red in the 10-inch: it has an orange centre with ruby fringes (R.).  
 Apr. 16. Nova, in 10-inch, power 45, is very red (R.). Nova to-night seems to be more red in the  $1\frac{3}{4}$ -inch than on Apr. 15 (W.). With 10-inch, power 90, Nova is more red than on Apr. 13 (C.).  
 Apr. 17. At 8<sup>h</sup> 0<sup>m</sup>, centre of image of Nova yellow, with very red fringes, in 10-inch, power 45; but in "finder" orange-red only, less red than on Apr. 16 (R.). The Nova was found to be less red at 9<sup>h</sup> 0<sup>m</sup> than in the twilight (R.). Nova reddish-yellow in

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1901.

- Marlborough at 9.0 (W.). The Nova gradually became less red as it sank lower into the mist and cloud; the fringe had nearly disappeared at 10.30 (R.).
- Apr. 19. Reddish-yellow in the  $1\frac{3}{4}$ -inch (W.). The star was very red in the 10-inch: its redness was maintained during the evening, 7.40 to 10.20 (R.).
- Apr. 20. Nova very red in the 10-inch (R.). No. 55 is orange (W.). Nova red in Marlborough (C.).
- Apr. 22. Image of Nova red in  $1\frac{3}{4}$ -inch (W.). Centre of Nova orange with red fringe in 10-inch; redness not so marked as on Apr. 20, certainly not so much as on Apr. 19 (R.).
- Apr. 23. Nova not so red in  $1\frac{3}{4}$ -inch, but is a deep orange (W.). Nova less red in Marlborough telescope than on Apr. 20; to the naked eye, stars scintillating greatly (C.).
- Apr. 24. The difference of colour of Nova and 52 is very marked. Nova is more red than on 23rd (W.). Nova more red in 10-inch than on 23rd (C.).
- Apr. 25. With  $1\frac{3}{4}$ -inch Nova is dull reddish; compared with all other stars it appears a "flatter" colour. Much deeper colour and duller than No. 40 (W.). Nova is very red (C.).
- Apr. 26. Nova is too low for definite colour observation in the  $1\frac{3}{4}$ -inch, but is certainly reddish and dull in contrast to No. 40 and other stars (W.).
- Apr. 28. Nova reddish in  $1\frac{3}{4}$ -inch (W.).
- Apr. 29. Nova very red to-night in 10-inch in contrast to the comparison stars (R.).
- May 1. Nova yellowish-red. No. 40 bright yellowish. Nos. 52 and 50, white (W.).
- May 3. Nova red in Barclay "finder" (C.). Nova reddish, in strong contrast to 52, in the 10-inch and "finder" (W.).
- May 4. Nova very red in the 10-inch (C.).
- May 6. Ruby fringes to image of Nova in 10-inch (R.). Very red in 10-inch (C.).
- May 8. Caught a glimpse of the Nova in a break at 8.25 in the 10-inch telescope. Could not estimate magnitude, but from the absence of any marked colour I suspect the Nova to be near one of its maxima (R.).

The observers were : Dr. Rambaut, indicated by A.A.R.

Mr. Wickham,	"	W.
Mr. Robinson,	"	R.
Mr. McClellan,	"	C.

Radcliffe Observatory, Oxford :

1901 May 9.

*Additional Note on the Position of Nova Persei, and a Comparison of Photographic Magnitudes of Neighbouring Stars with those of Fr. Hagen's Chart and Catalogue.\** By F. A. Bellamy, F.R.Met.Soc.

In a former paper (*Monthly Notices*, lxi. p. 340) the position of the *Nova* and comparison stars were based upon the 31 stars in the Bonn A.G. Catalogue  $+40^{\circ}$  to  $+50^{\circ}$  reduced to epoch 1900.0. It will be seen on reference to Table I. (p. 341) that two stars 2972 and 2983 have rather large residuals in R.A.,  $+0^s.55$  and  $+0^s.33$  respectively. These quantities being of the same sign and both the stars coming into the same sides of the equations, east and south halves of the plate, I thought the plate constants might be improved by omitting these two stars, and accordingly obtained these four equations (the computations of  $\xi'$  and  $\eta'$  of the Bonn stars, and the means of the Oxford measures being carried to the fourth decimal of the réseau intervals) :

$$\left. \begin{array}{l} \text{West half} \quad 8.4362a + 13.7498b + c = +1.2725 \\ \text{East half} \quad 18.3311a + 13.7823b + c = +1.2671 \\ \text{North half} \quad 13.0493a + 18.6997b + c = +1.2444 \\ \text{South half} \quad 13.3658a + 9.1601b + c = +1.2936 \end{array} \right\} \text{ and } \left\{ \begin{array}{l} x - \xi' \\ y - \eta' \\ +1.4199 \\ +1.4723 \\ +1.4426 \\ +1.4476 \end{array} \right\} \dots \quad (\text{A})$$

When solved in the usual way the following constants for plate 1728 are obtained :

$$-0.00053 \quad -0.00518 \quad +1.3482 \quad +0.00530 \quad -0.00035 \quad +1.3800$$

and the position of the *Nova* becomes

$$\text{R.A. 1900.0} \quad \begin{array}{c} \text{h} \quad \text{m} \quad \text{s} \\ 3 \quad 24 \quad 24.160 \end{array} \quad \text{Dec.} +43 \quad 33 \quad 42.45 \quad -1.7920 \quad -5.2585$$

The declination of the *Nova* (*Monthly Notices*, lxi. p. 342) should have been given as  $+43^{\circ} 33' 42''.51$ ; an error ( $0.1010$ ) was made in the very last step of the calculations; the whole of the work has been re-examined, but no other error found. In the former paper the plate constants were obtained with the inclusion of these two stars; for comparison, the equations, constants, and position of the *Nova* are here given.

\* Georgetown College Observatory, Washington, 2nd Catalogue and Chart of *Nova Persei* stars.